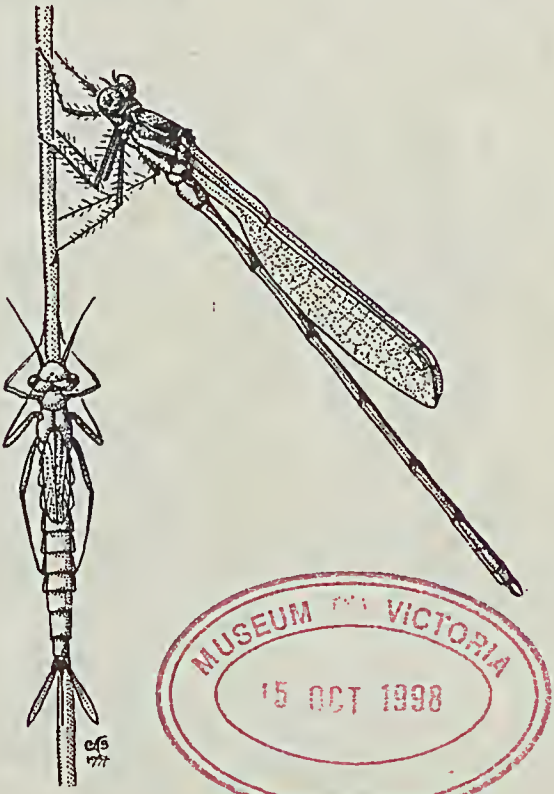
VICTORIAN ENTOMOLOGIST

VOL. 28 No. 5 OCTOBER 1998

Print Post Approved PP 349018/00058 Price: $ 3.00



News Bulletin of The Entomological Society of Victoria Inc.

THE ENTOMOLOGICAL SOCIETY OF VICTORIA (Inc)

MEMBERSHIP

Any person with an interest in entomology shall be eligible for Ordinary membership. Members of the Society include professional, amateur and student entomologists, all of whom receive the Society's News Bulletin, the Victorian Entomologist.

OBJECTIVES

The aims of the Society are:

(a) to stimulate the scientific study and discussion of all aspects of entomology,
(b) to gather, disseminate and record knowledge of all identifiable Australian insect species,
(c) to compile a comprehensive list of all Victorian insect species,
(d) to bring together in a congenial but scientific atmosphere all persons interested in entomology.

MEETINGS

The Society's meetings are held at room **AG17,** La Trobe University Carlton Campus, 625 Swanston Street, Carlton, Melway reference Map 2B E10 at 8 p.m. on the third Friday of even months, with the possible exception of the December meeting which may be held earlier. Lectures by guest speakers or members are a feature of many meetings at which there is ample opportunity for informal discussion between members with similar interests. Forums are also conducted by members on their own particular interest so that others may participate in discussions.

SUBSCRIPTIONS

Ordinary Member	$20.00
Country Member	$16.00 (Over 100 km from GPO Melbourne)
Student Member	$12.00
Associate Member	$ 5.00 (No News Bulletin)

No additional fee is payable for overseas posting by surface mail of the news bulletin. Associate Members, resident at the same address as, and being immediate relatives of an ordinary Member, do not automatically receive the Society's publications but in all other respects rank as ordinary Members.

Cover design by Alan Hyman.

Cover illustration of *Synlestes weyersii tillyardi* (O.: Synlestidea) ♂ by Catherine Symington.

MINUTES OF THE GENERAL MEETING, 21 AUGUST 1998

The President, A. Kellehear, opened the General Meeting at 8:02 pm

Present: D. Dobrosak, I. Endersby, A. & E. Farnworth, E. & P. Grey, A. Kellehear, R. MeMahon, R. MacPherson, L. Morey, D. & N. Stewart, J. Tinetti.

Visitors: M. Mereer, A. Morey, C. Peterson.

Apologies: P. Carwardine.

Minutes:

Minutes of the 19 June 1999 Annual General Meeting [*Vic. Ent.* 28(4): 62-63] were accepted with the amendment that P. Carwardine was present at the meeting (MacPherson/Endersby).

Treasurer's Report: The Treasurer presented the financial statement as of 21 August 1998:

Aecount balanees stand at: General Aceount $5,043; Le Souëf Award Aceount $3,387. Aecepted (I. Endersby/D. Stewart).

Editor's Report:

The Editor reported that the reeent surplus of papers was rapidly being depleted and further articles were requested for the Deeember and February issues of *Victorian Entomologist*. No illustrations on the Blue Triangle for next year's front eover had been received to date.

General Business:

Promotion of Natural History at Pt Nepean Visitors Centre, Portsea: D. and N. Stewart brought the attention of those present to a natural history promotion at the Pt Nepean Visitors Centre, Pt Nepean Road, Portsea on 7th to 13th of September 1998. D. and N. Stewart agreed to represent the Soeiety during the promotion.

Membership: E. Makon, J. Shield and A. Sundholm were elected to membership. Applications for membership were received from R. MeMahon and D. Leviston.

Yellow pages listing: I. Endersby reported that the Society would be listed in the next issue of the Melbourne Yellow Pages.

Speakers:

Ian Endersby & Arthur Farnworth presented a talk on "Insect Photography". The speakers presented individual talks. Ian Endersby presented a series of slides detailing the effect of aperture on depth of field. Depth of field is one of the major factors which requires attention in maero photography and Ian ably demonstrated the results of different apertures by means of a series of slides. Many of Ian's slides were taken using a ring-flash, usually frowned upon by many serious nature photographers, which was shown to give excellent results in most circumstances.

Arthur Farnworth presented the audience with a "hands on" approach to general maero photography, showing all those present his own methods and equipment developed over may years. Arthur is an accomplished photographer who uses a 100mm maero lens with up to two sets of extension rings and a calibrated dual flash setup. Arthur prefers to manually set exposure by varying the distance of the flash guns to the object being photographed. He has prepared an exposure graph based on the results of a series of test exposures with differing magnifications.

Auxilliary Talk - Chris Peterson

Chris Peterson presented an informative talk on Websites of interest to entomologists. Chris had extensively researched his subject and gave an informative and entertaining guide to the resources of interest to entomologists in the World Wide Web. A good start for those just beginning is one the many search engines such as Altavista. As well as genuine scientific information, light-hearted topics such as recipes for using insects as food (eg. chocolate ants!!) can be found. A summary of Chris' talk will be included in a future issue of *Victorian Entomologist.*

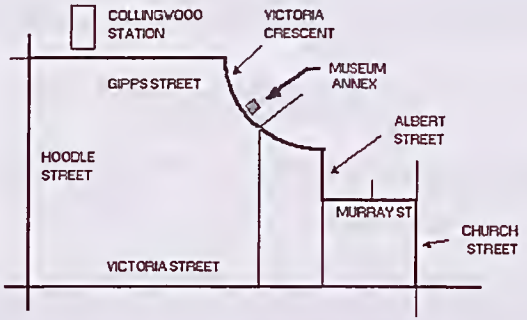
The President, Allan Kellehear, thanked all the speakers on behalf of those present.

The meeting was closed by the President at 9:47 pm.

MINUTES OF THE COUNCIL MEETING, 17 JULY 1998

No Council meeting was held due to a number of Councillors not being able to attend.

OCTOBER 16 GENERAL MEETING AND ECURSION



The August meeting on Friday 16th October will be in the form of an excursion to the Museum of Victoria Annexe at 71 Victoria Crescent, Abbotsford. Transport by train to Collingwood, tram to Victoria and Church Streets, or there is on street parking. MELWAY 2D. Admittance **8PM SHARP. The excusion will end at 9:30 PM.**

A list of members names, addresses and interests is published in *Victorion Entomologist* every even year. The December 1998 issue of *Victorion Entomologist* will include the current list. Should any members not wish their names, addresses or interests to be published, or if their address or interests have changes, please let the editor know prior to November 20 1998.

Dragonflies of Mount Buffalo National Park

Ian D. Endersby 56 Looker Road Montmorency Vic. 3094

Introduction

As part of the centenary celebrations of the Mount Buffalo National Park, the Field Naturalists Club of Victoria conducted a week long field survey covering many aspects of natural history between 7th to 14th February 1998. The invertebrate contribution included a survey of larval and adult Odonata.

Localities and Methods

The boundaries of Mount Buffalo National Park enclose an area of mainly rugged granite plateau at 1300 to 1600 metres and steep escarpments down to the valleys at 250 metres (Rowe 1970).

Sample Sites:

Eurobin Creek (Eur) a fast, rocky stream sampled for exuviae near the entrance to the Park.

Rollason's Falls (Rol) Buffalo Creek, sampled above the falls by dip netting and searching under rocks.

Kowan Plain (Kow) sphagnum bogs and interconnecting streams south east of the Tatra Inn.

Drillhole Rocks Track (Dlr) sphagnum bogs and interconnecting streams.

Lake Catani (Cat) an artificial wetland constructed in 1910, sampled by dip and aerial netting from the camping ground along its southern shore.

Reservoir (Res) sampled by dip and aerial netting around its circumference.

All of these localities are within the 10' grid YR44 of the ENTRECS scheme.

Larvae and exuviae were identified from Hawking (1986) and adults from Watson *et al.* (1991). The results table follows the checklist order and nomenclature of Houston & Watson (1988).

Collecting was carried out under National Parks Act 1975 Research Permit No: NP 978/150 and voucher specimens have been lodged with the Museum of Victoria.

Results

	Eur	Rol	Kow	Dhr	Cat	Res
ZYGOPTERA						
Coenagrionidae						
Austroagrion watsoni						A
Lestidae						
Austrolestes annulosus					L	
Austrolestes cingulatus						A
Austrolestes io						A
Austrolestes psyche					A	
ANISOPTERA						
Aeshnidae						
Aeshna brevistyla					A	
Austroaeshna flavomaculata	E	L	A			
Austroaeshna pulchra	E					
Hemianax papuensis					L	
Gomphidae						
Austrogomphus guerini					A	
Corduliidae						
Synthemis eustalacta			A	EA	A	A
Libellulidae						
Diplacodes bipunctata						A

A = adult; E = exuviae; L = larva.

Discussion

The sample sites form three similar pairs: Eurobin Creek and Rollasons Falls are rocky, fast flowing steams; Kowan Plain and Drillhole Rocks Track are boggy streams; Lake Catani and the Reservoir are artificial impoundments.

The two impoundments showed the greatest number of species, all of which are typically found in such habitats (but not necessarily restricted to them).

Synthemis eustalacta breeds in boggy seepages and swamps (Watson *et al.* 1991) but was also found flying at the edges of the two impoundments. A strong emergence was occurring during the week of the survey.

Austroaeshna flavomaculata is the only species of those collected which is restricted to alpine areas (Houston *et al.* 1988; Watson *et al.* 1991). Watson *et al.* (1991) describe its habitat as trickles but, at Mount Buffalo, larvae and exuviae were found in fast flowing streams at lower altitudes than the plateau. Fraser (1960) believed it to be confined to Mount Kosciusko, frequenting mountain streams.

Further surveys throughout the snow free seasons are warranted to obtain a full species list for this National Park and to determine the altitudinal and habitat range for *A. flavomaculata*.

Acknowledgments

Thanks are due to participants in the centenary survey; National Parks staff for encouragement and interest; and the Field Naturalists Club of Victoria for organising logistics.

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Do thrips help pollinate *Macrozamia* cycads?

Laurence A. Mound [1], Emma den Hollander [2] & Liam den Hollander [2]

[1] CSIRO Entomology, Canberra 2601 A.C.T.;
[2] c/o Department of Agriculture,Baron Hay Court, Perth, Western Australia

The method by which pollen is transferred from the male cones to the female cones of cycads has been discussed widely (see Forster *et al.* 1994; Donaldson, 1997), but for many cycad species there is little hard evidence concerning the mechanism involved. Wind pollination was long considered predominant, but evidence for pollination by beetles is now strong, both of *Encephalartos* cycads in South Africa (Donaldson, 1997) and of *Zamia* cycads in the Caribbean region (Tang, 1987). In eastern Australia, Chadwick (1993) concluded that a weevil was involved in the pollination of *Macrozamia communis*, but the evidence was not entirely conclusive. Similarly, the only insects that Connell & Ladd (1993) recorded in association with the cones of *Macrozamia riedlei* in Western Australia were three species of beetles, although these authors concluded from their exclusion experiments that the pollen of this cycad was carried by the wind as well as by beetles.

None of the above authors discussed the possibility of pollination being effected by any small insect, although Chadwick (1993) referred to "an undescribed thrips" in the male cones of *Macrozamia communis*, and thrips are known to be pollinators of a wide variety of flowering plants (see Lewis, 1997). Moreover, pollinator-exclusion experiments commonly use fabrics with a weave sufficiently coarse not to exclude thrips, these insects being well-known to move readily through minute spaces. Their small size, together with this thigmotactic behaviour of crawling into small spaces, makes them ideal candidates as pollinators of *Macrozamia* species, in which the aperture between the megasporophylls is so small. Cycadales exhibit a wide range of structural and ecological diversity, and it should not surprise us if pollination mechanisms differ between genera and families in such an ancient lineage.

The thrips species mentioned by Chadwick (1993) from the male cones of *Macrozamia communis* was described as *Cycadothrips chadwicki* Mound,1991. This thrips can be found abundantly in the male cones of *Macrozamia* in the forests near Batemans Bay (NSW), and it has also been recorded in large numbers northward into Queensland from the male cones of three more *Macrozamia* species (*lucida*, *miquellii*, *mountperriensis*) (Forster *et al.* 1994). However, it was not taken from four other members of this genus from which insects were collected (*fawcettii*, *douglasii*, *johnsonii* & *lomandroides*), nor yet from any species of *Cycas*. Despite vigourous collecting efforts, this thrips is not known from any other plant, and it apparently breeds only in the male cones of certain *Macrozamia* species.

Unfortunately, thrips are frequently overlooked due to their small size, but since the simplest way of demonstrating their presence is to trap flying adults, the opportunity provided by a brief visit by one of us (LAM) to Western Australia was taken to set out sticky traps on female cones of a population of *M. riedlei* about 25km south east of Perth. This population extended over an area of about 50 X 50 metres on a hillside, and comprised about 150 plants at varying stages of maturity. We could find only a single male cone at this time; this was almost lying on the ground, on a layer of shed pollen amongst which were many beetles as well as very large numbers of a *Cycadothrips* species in all life history stages. In contrast, female cones were readily found, and eight of these were selected for use with a trap, the most distant being less than 20 metres from the observed male cone.

Each trap consisted of a band of white card, 5 x 20 cm, covered with Tanglefoot, the proprietary sticky material used on insect traps. The sticky bands were inserted between the spines of the female cones around their greatest diameter, and left for 10 days. At this time each trap was found to bear many hundreds of insects, including the remains of a few butterflies and moths and various acalypterate fly species. Several specimens of *Acrotrichis*, a ptiliid beetle genus that is commonly found in leaf litter, were present on each strip, together with a few unidentified coccinelid beetles. In contrast to the observations on this cycad species by Connell *et al.* (1993), no members of the weevil genus *Tranes* were caught on the traps.

The dominant insects on each of the strips were the cycad beetle, *Paracucujus rostratus* (Boganiidae), and a new species of the thrips genus *Cycadothrips* that is currently being described (Mound & Marullo, 1998). Each strip bore at least 30 specimens of the beetle, but both sexes of the thrips were present at combined densities varying from 10 to 20 per cmsq, that is, between 1000 and 2000 thrips per strip. Regretably, no control strips had been placed on the surrounding vegetation. The possibility therefore exists that this thrips was dispersing at random in the area, but this seems unlikely because it could not be found by general collecting on surrounding vegetation on the day when the traps were put in place. Moreover, in eastern Australia the only previously known species in this genus has never been taken by general collecting, but can be taken in large numbers in the male cones of *Macrozamia* species.

Thus it seems probable that, although the *Cycadothrips* develops only in the male cones, adults of both sexes are attracted to the female cones. This might be fortuitous, with the thrips being attracted equally to the cones of both sexes, but what purpose this might serve in the biology of the insect is far from clear, a point also made by Chadwick (1993) with reference to the weevil *Tranes* on this plant. Mound (1991) pointed out that large, but not small, males of *Cycadothrips chadwicki* have stout thorn-like setae at the abdominal apex. This suggests that some form of competitive behaviour occurs between males during breeding, as is now known in other thrips species in which males vary in body size and armature (Crespi, 1988). If this is correct, then the female cones may provide a site for lekking by the male thrips, a type of behaviour that has recently been observed in the citrus pest thrips, *Pezothrips kellyanus*, in the Riverlands (Mound & Jackman 1998).

These observations by no means confirm that this thrips species is involved in the pollination of *Macrozamia* but, since they are known to breed only in the male cones and yet were trapped in very large numbers at female cones, their candidacy as pollinators merits further experimental investigation. Similar traps could be used to determine the periodicity of activity of the thrips - diurnal, seasonal and in relation to the development stage of the female cones. Certainly the adults on the traps were carrying pollen on their body. But proof that they are involved in delivering pollen into the female cones will be more difficult to acquire.

The genus *Cycadothrips* is one of the least advanced members of the Thysanoptera, and is the only genus in one sub-family of the Aeolothripidae (Mound 1991). This systematic position emphasises the possibility that the thrips has been associated with *Macrozamia* for a long time. Certainly, the association must pre-date the separation of the populations of *Macrozamia* into distinct species in eastern and western Australia. However, it is interesting that species of the South African genus *Encephalartos*, the sister-genus of *Macrozamia*, apparently do not have a specific thrips in their male cones (R. Oberprieller, pers comm.).

Only one other thrips species is recorded as specifically associated with cycads from anywhere in the world. Females of *Labiothrips tener* Bhatti & Mound, described on specimens from a water trap in New Guinea, were taken in large numbers from the leaves of *Cycas revoluta* at Darwin Botanic Gardens (Mound, 1996). Moreover, males and females of this species, together

with larvae, were found subsequently in considerable numbers at Humpty Doo and also at Holmes Jungle, Darwin, on the young foliage of *C. armstrongii* (20.xii 1996).

Our thanks are due to John Lawrence (CSIRO, Canberra) for identifying the beetles, to Darryl Hardie and Jeroen den Hollander (Dept. of Agriculture, W.A.) for encouragement and for providing the traps, to John S. Donaldson for kindly providing a copy of his manuscript, and to Rolf Oberprieller for helpful discussions on insect/cycad relationships.

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Butterflies Observed in Royal Botanic Gardens Annexe, Cranbourne

D.A.E. Morton

There follows a list of the butterflies I have observed on taking the same walk in the Annexe on the dates listed. The walk was from Stringybark Picnic Area along Grass-Tree Track and Tea-Tree Track and Tea-Tree Track to Trig Point Lookout, and then back to the Picnic Area *via* Possum Gully Track and Manna Gum Track. About three hours in the middle of the day were spent at the Gardens each time.

I am sure that there are many other species to be seen in the area, and would be grateful to be told of any that Members might have noticed there.

26 October 1996

Delias aganippe
Delias harpalyce
Pieris rapae
Vanessa kershawi
Vaness itea
Tisiphone abeona albifascia (larvae)
Candalides hyacinthina hyacinthina
Zizina labradus labradus

2 January 1997

Heteronympha merope merope
Geitoneura acantha
Tisiphone abeona albifascia
Zizina labradus labradus

5 February 1997

Dispar compacta
Signeta flammeata
Pieris rapae
Heteronympha merope merope
Geitoneura acantha
Tisiphone abeona albifascia
Vanessa kershawi
Vaness itea
Zizina labradus labradus

27 March 1997

Heteronympha merope merope
Tisiphone abeona albifascia
Vaness itea
Zizina labradus labradus

7 October 1997

Pieris rapae
Vanessa kershawi
Vaness itea
Candalides hyacinthina hyacinthina
Zizina labradus labradus

4 February 1998

Dispar compacta
Hesperilla idothea idothea
Pieris rapae
Heteronympha merope merope
Geitoneura acantha
Geitoneura klugii
Tisiphone abeona
Junonia villida calybe
Ogyris olane ocela
Candalides hyacinthina hyacinthina
Lampides boeticus
Zizina labradus labradus

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Biological and Distributional Notes for Some Butterflies in Eastern Australia

Andrew Atkins, Design Department, The University of Newcastle, Callaghan, NSW 2308.

The following notes are made from recent records of butterflies from New South Wales.

Euschemon rafflesia (W.S. Macleay)
This skipper cannot be regarded as rare or endangered, but certainly in NSW it is local and restricted to littoral vine scrubs and upland rain forest in areas where the larval food plant, *Wilkiea*, is common. Some marginal habitats for this plant occur on the coast in the Newcastle-Gosford areas, but the Regent Skipper does not appear to be present south of Seal Rocks (where it is threatened). At Port Macquarie in December, 1996 numerous mature larvae were found on even small plants (less than Im high) growing sometimes in open sunny areas.

Trapezites symmomus Hübner
In montane areas of NSW to 1500m this skipper is monovoltine, flying in mid-summer, but in central and southern coastal areas the skipper normally flies only in late summer and autumn. In October, 1996 a male was observed on the coast near Coff's Harbour, and a female was captured and released at Port Macquarie a few days later. These records support the previous observations (Atkins, 1997) that the species is probably bivoltine in coastal northern NSW. A female of this skipper with unusually dark undersides was reared in January, 1997 from a larva collected from *Lomandra spicata* in dense rain forest at Dorrigo (750m), and in July, 1997 larvae were found on this plant near Upper Lansdowne, NSW. The larvae regularly feed on the riverine *L. histrix* from the Barrington area to Coff's Harbour. Two eggs of the coastal form were found at Dudley in April, 1998 laid on the upperside of dense webbing spun at the entrance of the shelter of a leaf-rolling spider.

Trapezites praxedes (Plötz)
More common in coastal heath-woodlands of the Newcastle-Sydney region, especially where *Lomandra obliqua* occurs, the species is also found mainly in spring and autumn in wet sclerophyll woodlands where the larvae feed on a variety of soft *Lomandra* species. In these latter habitats it occurs sympatrically with the recently described *T. genevieveae* Atkins which normally utilises *Lomandra spicata*. Three larvae of *T. praxedes* were reared to adults (1 male, 2 females) in February, 1997 collected at the edge of rain forest on *Lomandra longifolia* and a possible *L. longifolia-spicata* hybrid at O'Sullivan's Gap, near Bulahdelah. This locality is in the immediate vicinity of breeding areas of the univoltine, summer flying *T. genevieveae*, and confirms a southern sympatricity for these two skippers. In late December, 1996 a worn male of *T praxedes* was collected near Coff's Harbour, suggesting that this species has at least two broods each year in northern NSW.

Trapezites genevieveae Atkins
Over 24 localities are listed for this recently described skipper (Atkins, 1997). Additional records for eastern New South Wales localities are here listed. Familiar oblique larval eats and old larval shelters were found on *Lomandra spicata* in dense rainforest at 1100 m elevation on the Gibraltar Range, west of Grafton NSW. This is a new intermediate record (between Coff's Harbour and Lismore district) for this skipper. In July, 1997 larvae were found on this host plant 15 km WNW of Upper Lansdowne (500 m) inland from Taree NSW and larval eats were also observed on the same plant in the Telegherry and Frying Pan Creek areas of Chichester State Forest (400 m), 20 km North of Dungog, NSW.

Toxidia andersoni (Kirby)
The common larval foodplant in NSW, north of Newcastle is *Poa queenslandicus* that grows in the upland wet sclerophyll and Beech forests. This grass is common in the Gibraltar Range west of Grafton where in, April, 1997, 2nd-3rd parasitised instar larvae of this skipper were found in rolled leaf-shelters on plants growing at an elevation of about 1 100m. The distinctive V-shaped eats on this foodplant and larvae were also observed at Dixies Top (900m) and Chichester Dam (400m) in Chichester State Forest, and near Vincents Lookout (300 m), Coopernook Forest, NW of Taree.

Hesperilla mastersi Waterhouse
Although very local this attractive skipper is found throughout the wet coastal scrubs and wet selerophyll forest bordering rain forest in New South Wales wherever the larval host plant *Gahnia melanocarpa* occurs. Some recent observations of adults or larvae include Watagan Mountains, Mt Allyn, Upper Williams River, Grandis, O' Sullivans Gap, Jerusalem Creek - Problem Creek area (Chichester State Forest), Wallangat Forest, Upper Lansdowne, Middle Brother, Port Macquarie and Dorrigo.

Suniana sunias (Felder)
Several specimens were observed (one male captured) at Salamander Bay, Port Stephens, NSW, flying in dense suburban scrub.

Telicota colon (Fabricius)
The *Telicota* genus needs revision in Australia. Genitalic studies by myself, Michael Braby et al. show that both male and female genitalia in some species appear variable, particularly from wide-ranging localities. Telecota colon, in particular, appears to have local recognisable forms (at least by dissection). One from the central coast of NSW appears closest to that from inland elevated areas of Queensland, differing marginally from those from rainforest areas of that latter State. However, I have a male and female from near Mackay that differ quite noticeably from other localities. It is obvious that more material is needed from a wide range of localities and habitats. Further studies would also be needed on type material of this Indo - Australian genus.

Telicota eurotas (C. Felder)
This species is also under review (M. Braby, pers. comm.). A southern form of this very local and scarce skipper is described as subspecies *eurychlora* Lower. In NSW it occurs from at least Port Macquarie and the Myall Lakes (Mayo, pers. comm. and pers. observ), south to Nowra, with a population still extant in East Gippsland, Victoria (see Edwards, 1998). This taxon appears to mainly utilize *Cladium procerum* (S.T. Blake) as the larval foodplant throughout its range. This large, water-bound sedge is becoming rare along the central coast of NSW (habitat drainage), but a few colonies remain in the Newcastle region, several harbouring the skipper; these include North Belmont; Gateshead and Bennets Green (bordering Jewell's Swamp); Redhead Lagoon and South Redhead Beach. Typical habitats of the sedge are riverine *Melaleuca* flood-banks, swamp heath communities and sand-dune bounded marshlands (sometimes elevated). The plants are found in fresh water or semi-saline (tidal) streams and semi-brackish water-holes or billabongs. The skipper now appears to be extinct from Umina (near Woy Woy) due to destruction of foodplants.

Heteronympha mirifica (Butler)
A widely distributed, but very local species in NSW, this satyrid occurs in wet sclerophyll and rain forests along the coast and montane hinterlands. I have records from Wiseman's Ferry; Mt Sugarloaf and Watagan Mts near Newcastle; several areas in the Barrington Ranges up to an elevation of 1400m; Bulahdelah; Wallangat Forest and Smith's Lake in the Myall Lakes area; and Middle and North Brother (near Lauriton). Variably patterned and toned, but usually

chocolate-coloured, the larvae are easily reared on common grasses. At Bruxner Park, near Coff's Harbour in April, 1997 several females were observed descending from the canopy of rainforest trees to flutter amongst leaf litter in shaded areas. Eggs were deposited on stems and the underside of leaves of wire-grass (probably *Entolasia* sp. ; Poaceae). Females were also quite common on the slopes of Cabbagetree Mountain in March this year and were observed laying on similar grasses also growing in shaded areas.

Heteronympha paradelpha Lower
A male was closely observed, flying and settling on the ground in a fern-tree gully at the base of the Buffalo Ranges, Victoria about 6 kms south-west of Porepunkah on the 9th of February, 1998. Another specimen, identified as a male of this species was also observed from a distance of 7 metres in a fern-tree gully in the lower foothills of the Buangor-Mt Cole Ranges in western Victoria. This individual, characteristically a bright orange-brown colour, flew rapidly and spirally upward around a tall *Eucalyptus* tree.

Heteronympha banksii (Leach) Normally a montane species on the central coast of NSW, a few colonies occur near sea-level at Newcastle. A female of this species was observed in April, 1997 at Bruxner Park, NSW (northern coast) at an elevation of about 400m. Several males and a female were observed at 1600 metres on the 18th March, 1998 on the Barrington Tops, NSW.

Heteronympha solandri Waterhouse
Specimens from Lorne and the Otway Ranges in southern Victoria are small and dark with narrow wings and resemble *H. banksii*. Both males and females of this form (underside variable from mottled mid-brown to dark purpleish-brown) were not uncommon in early February on the upper slopes of Mt Sabine in late morning and early afternoon. Males were patrolling or resting on the over-hanging canopy of shrubs and trees; females alighting near *Tetrarrhena* clumps and other wire-grasses near the base of trees in sunny glades in the early afternoon, apparently laying eggs. Many males and a few females of the larger brighter form of this species (underside usually ochreaus-yellow) were observed on the summits and slopes of Ben Nevis and Mt Cole (both near Ararat) on the 4th of February, 1998. Both sexes were mostly seen in association with large tussocks of *Poa*, but at lower elevations (600m), two females were observed ovipositing near the bases of the same *Tetrarrhena* species seen at Mt Sabine two days earlier. Males were very active in mild to warm weather from 7am to 8pm at this locality. A few days later, at Mt Buffalo, several males and females (the typical form of this satyrid) flew from dusk to dawn at 1600m, settling in snow-gum thickets growing around granite outcrops. Females at this locality appeared to be selecting a variety of grasses to oviposite- usually in sheltered areas.

Oreixenica correae (Olliff)
Extremely numerous from 1000 - 1600 metres on Mt Buffalo in early February, 1998. Both sexes (mainly males) roosted together at night in clusters of up to 50 specimens on low bushes.

Oreixenica kershawi (Miskin)
One male observed roosting with *O. correae* at 1600m elevation on Mt Buffalo. Undoubtedly further colonies exist in sheltered gullies at a lower elevation.

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Butterfly Watching in Tasmania - Part III

Kelvyn L. Dunn
e-mail: dunnk@knoxy.agvie.gov.au

As a preamble, the writeup of the following four accounts (Parts 3-6) was largely completed by June 1996 (after writing parts 1 and 2 during February) when the events were fresh in mind. However, prior to their recent submission, I have added in some contemporary references which have since come to hand. Readers are reminded that altitude is important in the local distribution of some Tamanian forms, and should remember that clock times are in ESST (i.e. daylight saving time; viz. EST+1hr).

After my successful visit in January 1996 (Dunn 1998a,b), I was keen to return in autumn to see a larger variety of the State's species, subspecies and local forms and, in particular, the endemic Ptunarra Brown butterfly which flies late in the season. During March of the same year, over an eight day period, I encountered many more species sometimes involving two or more subspecies enabling me to complete observations on a cumulative total of 25 of the 37 resident Tasmanian butterflies.

On March 8th, 1996 I arrived in Hobart to be greeted by an overcast sky and periods of drissle. By midday, however, the cloud cover began to disperse providing occasional sunny periods and whetting my appetite as to the interesting butterflies I hoped to see shortly. Armed with Peter McQuillan's field companion, *Butterflies of Tasmania* - a 'quick and easy' identification guide to the State's fauna, and a rather delapidated copy of Common and Waterhouse (1981), *Butterflies of Australia*, tossed somewhere in the back of the car as an emergency backup source, I headed out to Barilla Bay, east of the city.

Barilla Bay, situated near Cambridge, is largely an undisturbed area of estuarine sedgeland and, most importantly, the type locality of a small and obscure lycaenid, *Theclinesthes serpentata lavara*. This unique population was discovered during late March of 1952 by J.R. Cunningham, and named two years later by the late Len Couchman, the then resident butterfly expert. The adults are very localised in what seems an extensive area of suitable habitat. They were first seen flying over mudflats in late March, but during early April of the same season, Cunningham and Couchman (reported in Couchman 1954) observed them feeding at nearby flowers of the introduced African Box-thorn (*Lycium* sp.), a member of the plant family Solanaceae.

For a couple of hours I searched the extensive mudflats between the Cambridge Aerodrome and Mile Beach, where I thought the species might occur, but no lycaenids other than the Common grass blue (*Zizina labradus*) were about. Experienced or erudite readers may have twigged that I was, perhaps, a little early in the month for this butterfly. Extraordinary as this may seem, in southern Tasmania this is apparently so. Apart from this site I know of no other *T. serpentata* populations in which the adult activity is so seasonally limited nor seemingly localised to this extent. I later searched other areas of similar habitat on the east coast where I also thought the species ought to be, but found no evidence whatsoever!

The few individuals of *Z. labradus* I encountered were in grassy waste-lands adjoining the sedgeland. Here they flew in company with several other grassland species such as the hesperiine, *Taractrocera papyria*, the satyrine, *Heteronympha penelope diemeni* and the autumn nymphaline, *Junonia villida*. All four species were in similar abundance. Most of the *diemeni* were worn, but a single freshly emerged male, its wings still soft, seemed an exception. This individual also appeared somewhat aberrant having more extensive orange areas above and included an orange suffusion over parts of the

darker brown patterns, creating, in part, a superficial similarity to subspecies *alope* from western Victoria.

The sedge, *Gahnia filum*, was prolific in this region, and close to the waters edge a few freshly emerged males of *Hesperilla chrysotricha plebeia* darted between the larval hosts. It came as a surprise to see fresh adults of this trapezitine skipper so late in the season, particularly at this southern latitude. I had no March records from Tasmania on my database, and, indeed, the butterfly seemingly does not fly during March in Victoria! McQuillan (1994) records its flight period to finish during early March in Tasmania, which, if correct, would necessitate the remaining adults to comprise mainly females, be few in number and any males still surviving would be old and worn. However, no females were seen on the wing, and an immediate search of the foodplants revealed several mature larvae and numerous pupae of both sexes. It seemed the species was locally plentiful and many pupae showed wing coloration indicating they were soon to emerge! Indeed, three female pupae eclosed within an hour of their discovery confirming a genuine autumn brood and not a few anomalous late emerging individuals as I initially supposed. An uneclosed pupal sex ratio of 2:9 (n=11) showed an obvious skew toward females perhaps suggesting most of the males had already emerged. Moreover, many empty pupal shells were present in the characteristic twisted shelters created by the larvae, but these exuviae may have been from earlier generations.

Soon after my arrival here a couple of 'sus-looking blokes' (meaning backdoor characters for non-Australian readers) appeared, independently, and within minutes of each other - one equipped with a fairly recent 4WD and the other in an aged pale ute. They parked some distance from each other and equidistant from my rental sedan. The arrival of two vehicles, more or less simultaneously, at this lonely spot seemed unusual and I initially thought I ought to keep an eye on my car.

Curiously, both remained within their vehicle cabins and spent considerable time communicating on and off over mobile phones. With the aid of binoculars I determined that these men were monitoring me (and the sedgelands) with field glasses. Believing that I might, in some way, be acting offensively or, perhaps, (recalling my Cooktown encounter at 'Marijuana Mile') could even be similarly threatened at any moment, I, in due time, returned to the parking bay and approached the nearer of the two, a solid, heavily-tattooed character, who, after a moment or two's hesitation, wound down his window. A cheery explanation of my activities was silently received, and after a brief pause I asked whether he and his mate were birdwatching. I was brusquely told that they were "just looking" which included a malevolent inflection inferring I should ask no further questions! Most naturalists prefer to pursue their studies in relative privacy (i.e. away from scoffers and the like), and contemplating a set of lenses periodically focused on me for what seemed like lengthy periods soon gave rise to distracting feelings of paranoia. After nearly two hours of seemingly unrelenting attention I had had enough, and, somewhat cautiously, departed. From there I headed east for the Tasman Peninsula, breathing a sigh of relief to be out of the area!

At Eagle Hawk Neck I visited the Tasman Arch National Park for a quick look at the Blow Hole, Devil's Kitchen and Arch which I last visited in 1979. My earlier visit to this coastal heathland reserve was as a teenager, and now, years later, standing here again I enjoyed the nostalgia of some long forgotten memories. It was a cool winter's day back then, but now in early autumn, with reasonable weather for butterfly activity I was pleased to see a few species about. Worn *H. penelope diemeni* were active accompanied by an occasional Cabbage butterfly (*Pieris rapae*) which had probably wandered in from a nearby township. Close by, in open forest at circa 100m above sea level (asl), near Waterfall Bay Lookout, a few males and females of *Heteronympha merope* and *Geitoneura klugii* were settled in filtered sunlight on leaf debris in grassy patches along the road-shoulder area. My approach usually disturbed them, but they did not fly far before settling again.

Overall, on a site by site basis, *H. merope* was less often encountered than *H. penelope*; the latter was more or less ubiquitous in the northern and eastern portion of the state, but became sporadic or localised at higher altitudes. During March, I encountered *H. merope* at only 22 sites and all below

464m, compared with over 50 sites for *H. p. diemeni* and another 10 sites occupied by *H. p. panope* or *panope*-like forms at higher altitudes. Given its broad altitudinal range, *H. penelope* occupied several habitat types, but *H. merope* favoured wet open forests or was confined to damp areas within dry sclerophyll forests. Where *merope* occurred it was usually fairly common, but at this time of year the females were most conspicuous, yet often still accompanied by one or more worn males. On the mainland, in Victoria, males are not usually seen after the end of January or at the very latest February, but in Tasmania the male flight period extends into autumn. A small number of males was still present at 11 of the 22 sites and at two of these only males were recorded! Remarkably, but perhaps due to the southern latitude, here at Waterfall Bay Lookout on the east coast of the Tasman Peninsula, the males were still in quite reasonable condition.

The horrendous convict settlement of Port Arthur was established in 1830 and has a macabre history with more than 1700 unmarked graves on the Island of the Dead. This small off-shore burial isle was said to be haunted according to the account of one terrified convict who had been abandoned there for a period of solitary confinement. Until 1877 Port Arthur served as a place of incarceration for some 12 thousand prisoners and the bleak ruins are sombre reminders of the utter despair which existed there. The gentry and well-to-do of the period no doubt avoided this miserable place, so it not surprising that another century passed before butterfly specimens from Port Arthur began to appear in Australian collections! The earliest specimens I have examined are those of *H. merope* and *Candalides acasta* collected in January 1934, but in contrast, there are museum specimens from Hobart which date from at least December 1888.

Today, it is rumoured that there is an evil curse on the removal or possession of material, animate or inanimate, from the penal settlement, but this no doubt has been promoted on the 'Ghost Tours' to dissuade souveniering of convict-made bricks and other artifacts. Nevertheless, coincidence or otherwise, there are surprisingly few specimens from Port Arthur in museum collections! I arrived in late afternoon - fortunately, several weeks before the recent massacre of April 28th which left 35 dead and many others injured - and was still at an opportune hour to see a few *H. merope* (both sexes), *H. penelope* (both sexes) and *G. klugii* sunning themselves and flitting through the tangle of cool temperate forest shrublayer at 1730 hrs.

For many years the Tasmanian population of *H. merope* has been treated as an endemic subspecies (*salazar*), recognised by only two characters - one per sex (Common & Waterhouse 1981). In recent years, Dunn and Dunn (1991) examined a series from Hobart and concluded that neither sex from this district could be reliably distinguished as Tasmanian based on the literal interpretation of the published criteria. Both assessments are insufficiently representative; there are in fact more (albeit variable) characters than formerly recognised and material from Hobart is seemingly unrepresentative of the Island's population as a whole, especially those from the northern coast. Being the author of one of the above opinions I will briefly diverge here to clarify this taxonomic matter.

From six of the 27 *merope* populations encountered (during this and the January visit) I examined a random sample of 18 males for character assessment. In about 61% the brown patch on the forewing upperside between veins CuA2 and 1A+2A extended further postmedially (and sometimes heavily towards the anal vein), and in most males (72%) the hindwing postmedian-median semicircular sex-brand had a broad extension of dark pigment along the cubitus towards 1A+2A. Taken separately or in combination (56%) these expansions promote a slightly more sombre looking male - what Common and Waterhouse were attempting to describe by corollary. In addition, in 39% the hindwing subtornal ocelli was greatly enlarged with the outer circumference extending beyond CuA1 and CuA2 which normally enclosed this ocellus. In 17% the inner black diameter of this ocellus was noticeably expanded similar to those from Western Australia!

Among eleven females (from six sites over both visits) the upperside hindwing subtornal ocellus generally seemed a little larger than most mainland nominate adults, but was still constrained between the veins. In 55% the ocellus expanded fully to the veins. The "large yellow patches in the outer half

of the forewing" (Common & Waterhouse 1981) also seemed a little duller in freshly emerged adults but became increasingly unreliable if not impossible to assess with age or wing wear.

The most useful character in the male, also present but to a much lessened extent in some females, is a variable darkening to the subbasal-submedian areas of both wings. This can be more easily recognised in the male hindwing cell area and, on occasion, the upperside forewing cell of females. Although some males (17%) were inseparable from those from Victoria, the frequent sombre phenotype and, bizarre, occasional enlargement of the hindwing ocellus I now believe support their recognition as a local form.

With drissle greeting the morning, I headed out towards Lime Bay in the northwest of the peninsula. I visited the Coal Mines Historic Site and saw the ruins of the sandstone confinement areas and mine workings. Here the appalling conditions and harsh treatment may have been worse than at Port Arthur.

Nearby, in estuarine habitat at Saltwater River a number of eclosed pupae of *H. chrysotricha plebeia* were discovered on *Gahnia filum* but no adults were flying. A few *G. klugii*, *H. merope* and *J. villida* were active at the famous (at least amongst butterfly observers) Lime Bay Nature Reserve, but the ensuring unsuitable weather limited any useful butterfly observations. A large colony of *Pseudalmenus chlorinda myrsilus* occurs in this reserve and the ant (*Anonychomyrma biconvexa*) which attends the larvae was prolific on some of the larger gum trees. It was much too late in the year to see adults of this lycaenid, but an empty pupal shell, found adhered beneath some flaky *Eucalyptus* bark near a large ant-occupied *Acacia dealbata* tree, satisfied my curiosity as to the colony's continued existence in the camping ground.

The Lime Bay hairstreak population seems to extend out to some four kilometres north-east of Gwandalan where a small *A. dealbata* showed signs of severe larval attack. An adjacent eucalypt harboured one or more live pupae. Unfortunately at Lime Bay the precarious existence of *myrsilus* is threatened by periodic removal of bark by campers and day tourists for kindling, where beneath the salubrious odour of sizzling snags and chops on the BBQ, perhaps, many pupae of this pretty butterfly have, over the years, met untimely deaths?

The erection of some large informative signs discouraging the removal of bark from trees or gathering of debris could help the butterfly. Moreover, on my visit some campers were seen gathering a trailer load of fallen branches for firewood and, although close to or just outside the park boundary, this debris, nevertheless, may have contained pupae as their gathering site was within a hundred metres of an outlying hairstreak population! Although not recorded in the literature to pupate amongst ground litter, at St Fillans in Victoria, Nigel Quick and I once found several pupae of *P. chlorinda zephyrus* in fallen branches, and amongst ant-occupied rotting timber lying on the ground within two metres of a larval host. The Silky hairstreak spends much of the year in the pupal stage and hence is most at risk from such activity.

After departing the Tasman Peninsula the sky began to clear so some regular butterfly observations seemed likely. In mid afternoon, at Nugent, I stopped in an area of open eucalypt forest characterised by an abundance of fireweed amongst the understorey, and although the temperature was less than 17°C the area was bathed in full sunshine. Similar habitat on the mainland frequently harbours *Oreixenica lathoniella herceus* and it was not surprising that the nominate (*lathoniella*) subspecies was immediately seen. Here, the satyrine was freshly emerged albeit in low numbers. At this upland locality, about 300m asl, many cabbage butterflies and near-fresh adults of *H.p. diemeni* were also present. Apart from these three widespread species, no other butterfly species were to be seen which I attributed to the cool weather.

Heading north along the coast via Triabunna to Swansea little of interest was encountered until ascending inland to the montane Lake Leake district where I hoped to see the rare *Oreixenica ptunarra angeli*. First encountered in 1947 it was named soon after in 1953 in honour of a local

butterfly collector - and its inadvertent discoverer - the late Syd Angel; Syd was the twin brother of the late Frank Angel, a renowned South Australian butterfly collector. It is without question the most elusive of the three described subspecies, all of which are endemic, and is characterised by having particularly well marked females (Prince 1988).

Well adapted to its cold montane habitat, *O. ptunarra* is the smallest and hairiest satyrine in Australia (McQuillan & Ek 1997). It inhabits the elevated grasslands and grassy woodlands of central Tasmania over an altitudinal range from 320-910m asl. All populations are strongly localised because of the discontinuous nature of their habitat, the limited dispersal powers of the female and relatively low fecundity.

Of pressing interest to the uninitiated is how to distinguish the active adults in the field from other similar looking butterflies. And, for an answer to this I consulted the writings of Couchman (1953) who commented,

> *"It has a quite characteristic flight, usually only a few inches above the ground, the male especially flying in a much more direct and speedy manner than l.lathoniella."*

"We do not know the sister-species to *O. ptunarra* since no cladistic analysis of the genus is yet available...", McQuillan and Ek wrote recently. Based on my field experience with all six congeners, the mode of flight, adult behaviour, habitat and pupal habits of *O. ptunarra* seem most similar to *O. latialis* from the mainland and I suspect this to be its closest extant ally.

On the eastern highlands conditions were mostly sunny with a high of about 20°C by mid afternoon on March 10th. Several suitable *Poa* grassland-marshes and plains at altitudes ranging from 500-600m were investigated but only *O.l. lathoniella* was present. At some sites, in particular, a shallow gully in pastureland near Pinnacles Creek (c. 500m asl), some 14 kilometres south-east of Campbell Town, *O. lathoniella* was prolific with a fair number of females seen. Mark Neyland (1992) commented that *O. p. angeli* flies in late March and only for a couple of weeks. Clearly I had preceeded its emergence. Being from the mainland I was astonished by such precise temporality, but in cool temperate Europe, for example, I am told that some butterflies can exhibit highly localised emergences. The *lathoniella* adults were in medium condition and males still visibly outnumbered females.

In a *Leptospermum* woodland marsh, at Hortons Creek (some 600m asl) situated about 5 kilometres west of Lake Leake, a few *Heteronympha cordace legana* were flying weakly amongst their larval host plant, *Carex appresa*. Here, I was fairly close to the type locality for this north-eastern subspecies. Only males were seen and all were in very worn condition. Their delicate flight immediately distinguished them from the many *O. lathoniella* which dominated the area. *H. cordace* has not previously been recorded flying during mid-March in Tasmania, and this record provides an important temporal extension to their documented flight period which was to February (McQuillan 1994).

Later that afternoon I returned to the coast and stayed overnight at Coles Bay with plans to explore parts of Freycinet National Park the next morning.

Continued as Part 4

The following maps (based on records held in the Dunn & Dunn National database) show the available distribution of two common species, *H. merope* (figure 3) and *G. klugii* (figure 4).

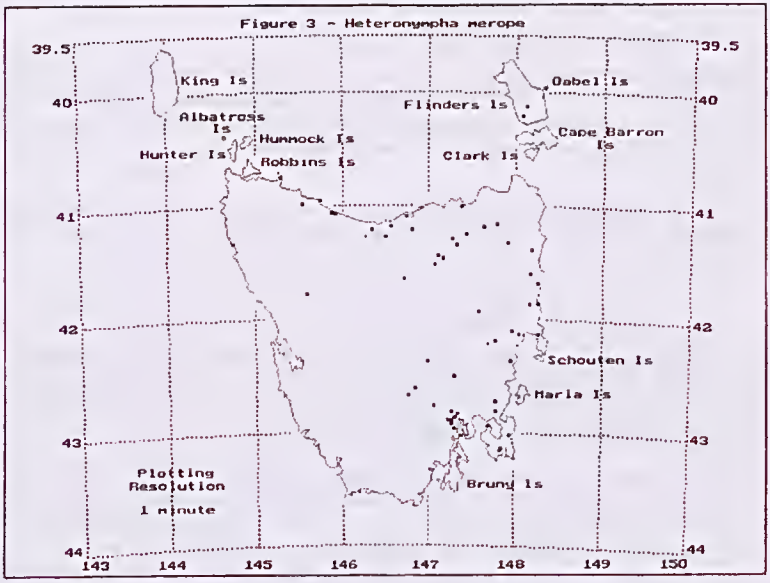
Figure 3 - Heteronympha merope
39.5
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143
144
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146
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148
149
150
King Is
Albatross Is
Hunter Is
Hunnock Is
Robbins Is
Flinders Is
Babel Is
Cape Barron Is
Clark Is
Schouten Is
Maria Is
Bruny Is
Plotting Resolution
1 minute

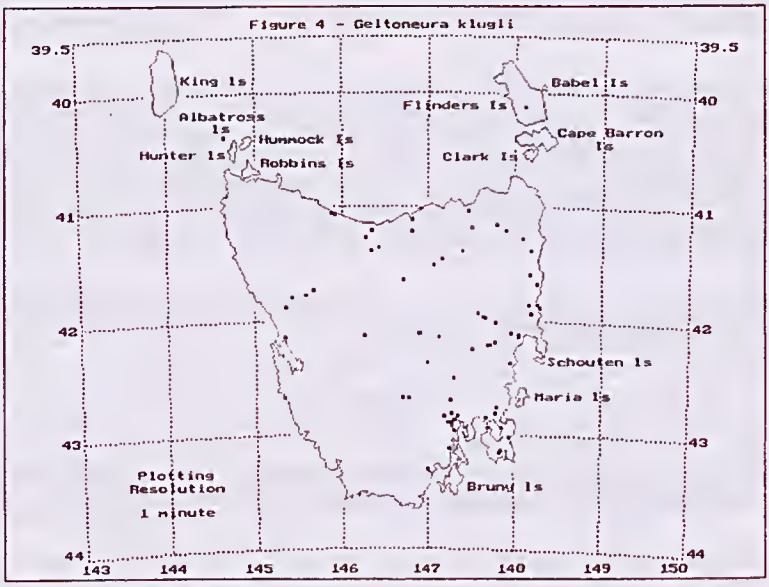
Figure 4 - Geltoneura klugli
39.5
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149
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King Is
Albatross Is
Hunter Is
Hunnock Is
Robbins Is
Flinders Is
Babel Is
Cape Barron Is
Clark Is
Schouten Is
Maria Is
Bruny Is
Plotting Resolution
1 minute

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Insect Behaviour (5)

[An occasional series reporting examples of insect ecology or ethology from the current literature]

Many insights into the theory of sperm competition have been developed from studies conducted on the Odonata. Some of these studies revealed that many dragonflies and damselflies transferred free spermatozoa rather than a spermatophore, as in many other insect groups. M.J. Siva-Jothy ["Odonate ejaculate structure and mating systems", *Odonatologica* 26: 415-437 (1997)] presents a hypothesis which relates sperm form to the ecological aspects of dragonfly mating systems.

In insects where many sperm are derived from a single spermatogonium, their heads are often embedded in a hyaline cap which usually disappears before the sperm enter the male's genital ducts. However, a few insects transfer these "bonded" sperm in a structure termed a *spermatodesm*. Examples can be found amongst the Orthoptera, Hemiptera, Thysanura, Coleoptera, Lepidoptera and Mantodea.

Siva-Jothy examined species from most families of the Odonata and he also measured spermatodesm breakdown rates in males and females. He found two types of spermatozoa: short, lanceolate and immotile; or long, flageolate and motile and these were generally constant within families. Also the families could be categorised by whether transfer was by: (a) intact spermatodesms; (b) individual spermatozoa; (c) single sperm as well as spermatodesms. Aeshnidae transfer intact spermatodesms so he sampled males and females over a 96 period to see how the spermatodesms broke down. In male *Aeshna mixta*, spermatodesms from the secondary genitalia did not change but in females the cap had commenced to break down at 72 hours after insemination. By 96 hours there was considerable physical breakdown.

Taxa that utilise free sperm tend to have their reproductive activity based around a territorial site where restricted resources can be defended. Females converge on the male territories and copulation occurs at the site with oviposition usually following immediately, quite often with mate guarding. In contrast, spermatodesm-utilising taxa tend to copulate away from the encounter and oviposition sites; there is little guarding and some time elapses before oviposition; and they use resources which are distributed in such a way as to be undefendable.

There are exceptions to this general classification but at least one nice example where a species that has a mating pattern different from other members of its family also has an ejaculate morphology that matches the hypothesis.

The value of spermatodesms has been postulated in other insect groups as:

- providing the hyaline cap as a nutrient investment by the male to increase female fitness;
- using nutrients from the hyaline cap to increase longevity of sperm;
- using the hyaline cap as a physical protection to the head of the sperm;
- producing grouped sperm which can out-compete individual sperm.

An interesting classification system has been proposed and it will be interesting to see if additional study will elucidate the mechanisms that are at work.

Ian Endersby

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The *Victorian Entomologist* is printed at MOORE Business Systems, Shell House Lower Lobby, 1 Spring Street, Melbourne, Victoria, 3000.

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DIARY OF COMING EVENTS

Friday 16 October General Meeting & Excursion
Museum Victoria Abbotsford Annex
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Friday 20 November Council Meeting

Friday 11 December General Meeting - Members Night
Members will give short talks and slide presentations

ISSN 0310 - 6780